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## MEMORANDUM

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TO: Greg Carli REF. NO.: 056393-07  
FROM: Aaron Stadnyk/cs/6 DATE: June 22, 2010  
CC: Renee Pionk  
RE: **Verification Sampling Plan for the Asphalt Plant and the MDNRE Properties  
12th Street Landfill Remedial Action Implementation  
Plainwell, Michigan**

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The following provides the basis for the development of the Verification Sampling Plan for the 12th Street Landfill - Operable Unit No. 4 (Site) of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site. In accordance with the final design, verification sampling is required for areas where off-Site excavation of paper residuals is to be conducted, which includes the Asphalt Plant Property to the west and the Michigan Department of Natural Resources and the Environment (MDNRE) property to the southeast.

As part of the final design report (Section 6.2.3 - Verification Soil Sampling on the MDNRE and the Asphalt Plant Property), the requirements for verification sampling are in accordance with Michigan Part 201 Generic Residential Cleanup Criteria (GRCC) pursuant to the 'MDNRE's (formerly Michigan Department of Environmental Quality (MDEQ)) Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria (STM; MDEQ-2002).

Based on the MDNRE STM guidance, the following presents the development of the Verification Sampling Plan for each off-Site excavation area.

### **A ASPHALT PLANT PROPERTY**

The total approximate area of the paper residuals on the Asphalt Plant property is 31,900 square feet (ft<sup>2</sup>) (0.73 acres). Consistent with the MDNRE STM guidance, for excavations that are between 0.25 acres and 3.0 acres, the sampling grid interval is calculated using the following formula:

$$GI = \frac{\sqrt{\frac{A}{\pi}}}{4}$$

Where, GI = Grid Interval (feet), and  
A = Surface Area (ft<sup>2</sup>).

Based on the approximate Asphalt Plant property surface area, the grid interval for the verification sampling was determined to be 25 feet by 25 feet.

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**ISO 9001**  
ENGINEERING DESIGN

Based on a 25 foot by 25 foot grid, a total of 75 grid points were identified, as shown on Figure 1. Consistent with the MDNRE STM guidance, a minimum of nine samples or 25 percent of the total grid points, whichever is larger, should be sampled to allow for a large enough data pool for statistical analysis. In the case of the Asphalt Plant property, 25 percent of the 75 grid points equates to approximately 19 samples. CRA has included one additional sample location to account minor increases in sidewall surface area, for a total of 20 verification samples to be collected from the Asphalt Plant property. The size of the excavation will be monitored during the excavation activities and additional samples will be added should the excavation area increase to the point where more than 20 samples are required by the MDNRE STM guidance. A random number generator was used to determine the locations of the 20 samples, as shown on Figure 1 and in Table 1.

## **B     MDNRE PROPERTY**

The total approximate area of excavation on the MDNRE property is 3,350 square feet (ft<sup>2</sup>) (0.08 acres). Consistent with the MDNRE STM guidance, for excavations that are below 0.25 acres the sampling grid interval is calculated using the following formula:

$$GI = \frac{\sqrt{A/\pi}}{2}$$

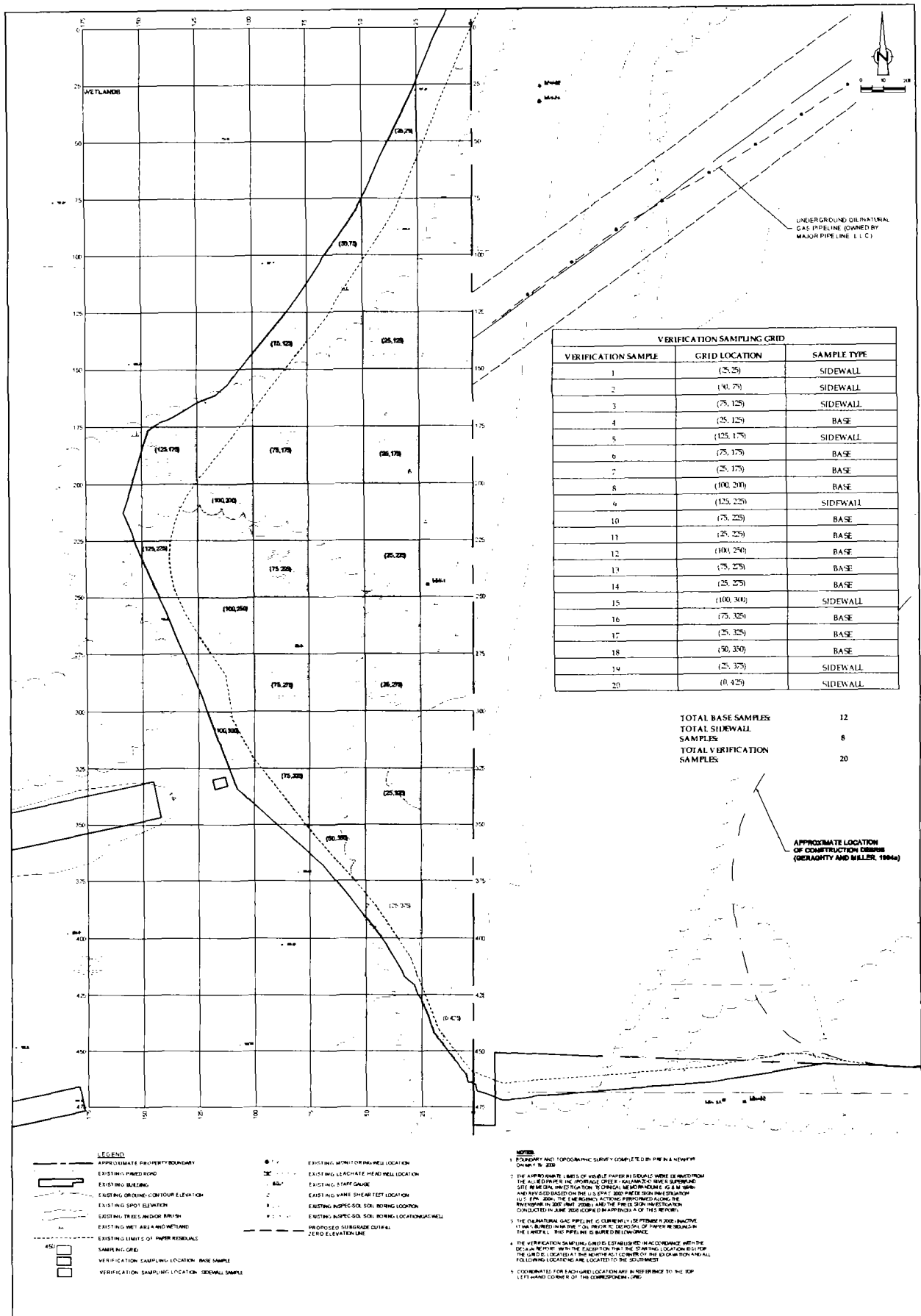
Where,     GI = Grid Interval (feet), and  
              A = Surface Area (ft<sup>2</sup>).

Based on the total approximate MDNRE surface area, the grid interval for the verification sampling was determined to be 16 feet by 16 feet.

To determine the preliminary estimated number of samples required, a 16 foot grid was plotted over the MDNRE property, as shown on Figure 2. Based on the plotted grid, a total of 26 grid points were identified. In the case of the MDNRE property, the minimum of nine samples is required, since 25 percent of the 26 grid points equates to only seven samples. A random number generator was used to determine the location of the nine samples, as shown on Figure 2 and in Table 2.

## **C     SUMMARY**

Based on the MDNRE STM guidance, verification samples will be collected from the Asphalt Plant and MDNRE properties, as shown in Table 1 and Table 2 respectively. It should be noted that an increase in surface area greater than 10 percent of the design estimate, will require re-evaluation of the verification sampling requirements. Also, all sample locations are contingent on field conditions and may be relocated based on field observations.

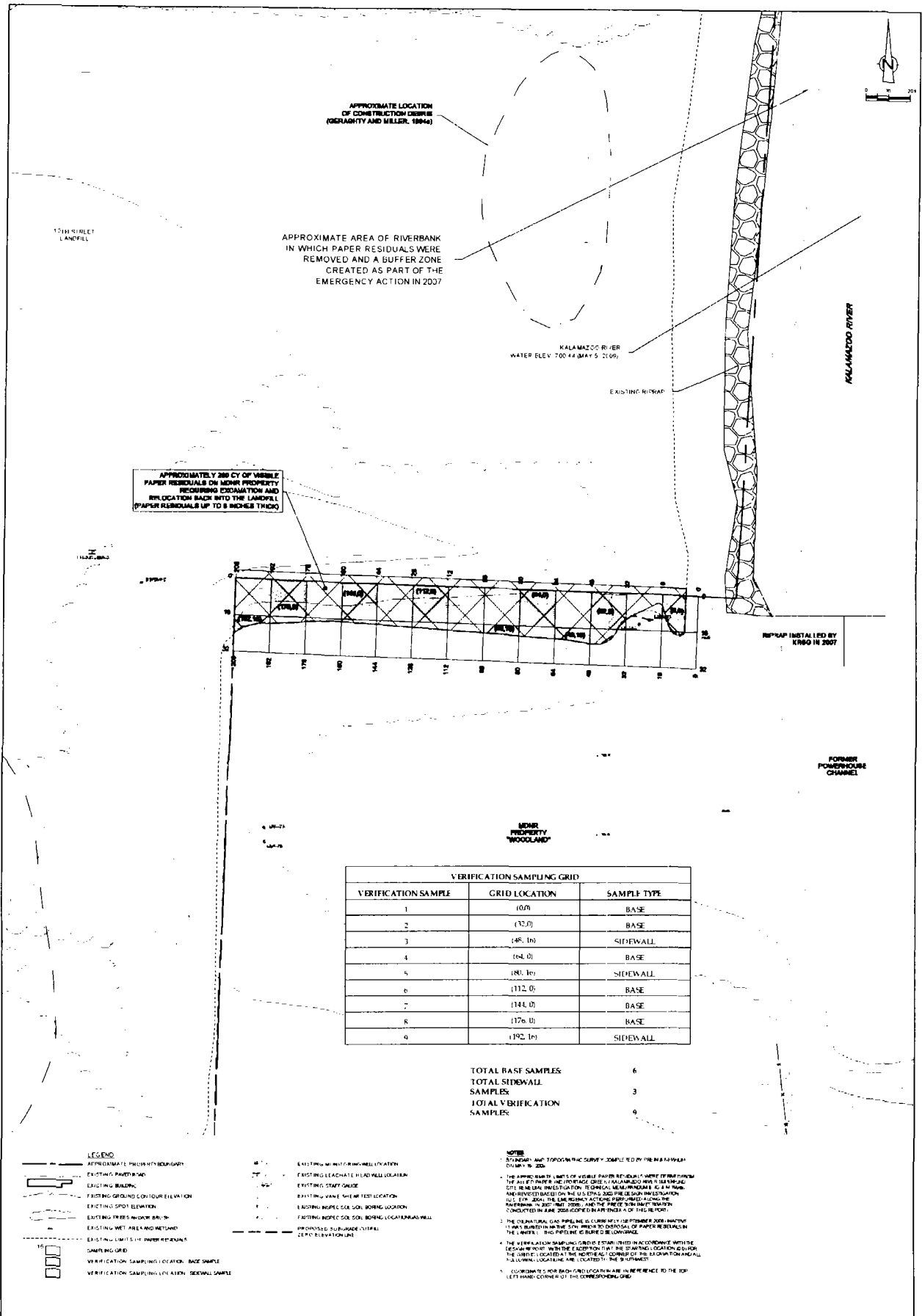


VERIFICATION SAMPLING GRID		
VERIFICATION SAMPLE	GRID LOCATION	SAMPLE TYPE
1	(25, 25)	SIDEWALL
2	(50, 75)	SIDEWALL
3	(75, 125)	SIDEWALL
4	(25, 125)	BASE
5	(125, 175)	SIDEWALL
6	(75, 175)	BASE
7	(25, 175)	BASE
8	(100, 200)	BASE
9	(125, 225)	SIDEWALL
10	(75, 225)	BASE
11	(25, 225)	BASE
12	(100, 250)	BASE
13	(75, 275)	BASE
14	(25, 275)	BASE
15	(100, 300)	SIDEWALL
16	(75, 325)	BASE
17	(25, 325)	BASE
18	(50, 350)	BASE
19	(25, 375)	SIDEWALL
20	(0, 425)	SIDEWALL

TOTAL BASE SAMPLES: 12  
 TOTAL SIDEWALL SAMPLES: 8  
 TOTAL VERIFICATION SAMPLES: 20

APPROXIMATE LOCATION OF CONSTRUCTION DEBRIS (DELAUGHTY AND MILLER, 1994a)

<b>REVISIONS</b> NO.   Revision   Date   By 1   REVISION FOR CORRECTIONS   APRIL 7, 2000   [Signature] 2   REVISION FOR 10% SUBMITTAL (PHE)   APRIL 14, 2000   [Signature]		<b>SCALE VERIFICATION</b> THIS MAP WAS MEASURED 1"=100' VERTICAL, ADJUSTED TO 1"=100' HORIZONTAL Approved: _____		<b>12th STREET LANDFILL</b> <b>OTSEGO TOWNSHIP, MICHIGAN</b>  <b>VERIFICATION SAMPLING PLAN</b> <b>ASPHALT PLANT PROPERTY</b> <b>(25' X 25' SAMPLE GRID)</b>		<b>COMETOGA-ROVERS &amp; ASSOCIATES</b> BASE ADAPTED FROM PREVIOUS RMT DESIGN Project Manager: A. S. ROVER   Date: JUNE 2000 Scale: AS SHOWN   Report No.: 56393-00   Drawing No.: MEM0006   Figure 1.1	
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VERIFICATION SAMPLING GRID		
VERIFICATION SAMPLE	GRID LOCATION	SAMPLE TYPE
1	(0,0)	BASE
2	(32,0)	BASE
3	(48, 10)	SIDEWALL
4	(64, 0)	BASE
5	(80, 10)	SIDEWALL
6	(112, 0)	BASE
7	(144, 0)	BASE
8	(176, 0)	BASE
9	(192, 10)	SIDEWALL

TOTAL BASE SAMPLES 6  
 TOTAL SIDEWALL SAMPLES 3  
 TOTAL VERIFICATION SAMPLES 9

- LEGEND**
- APPROXIMATE PROPERTY BOUNDARY
  - EXISTING PAVED ROAD
  - EXISTING BUILDING
  - EXISTING GROUND CONTOUR ELEVATION
  - EXISTING SPOT ELEVATION
  - EXISTING TREES AND/OR BUSH
  - EXISTING WET AREA AND WETLAND
  - EXISTING LIMITS OF PAPER RESIDUALS
  - SAMPLING GRID
  - VERIFICATION SAMPLING LOCATION: BASE SAMPLE
  - VERIFICATION SAMPLING LOCATION: SIDEWALL SAMPLE

- EXISTING MONITORING WELL LOCATION
- EXISTING LEACHATE HEAD VELL LOCATION
- EXISTING STAFF GAUGE
- EXISTING VANE SHEAR TEST LOCATION
- EXISTING BORER SOIL BORING LOCATION
- EXISTING BORER SOIL BORING LOCATION (WELL)
- PROPOSED ALUMINUM CULVERT
- EXISTING ELEVATION LINE

- NOTES**
1. EXISTING AND TOPOGRAPHIC SURVEY COMPLETED BY THE BUREAU OF LAND MANAGEMENT IN 2009.
  2. THE APPROXIMATE LIMITS OF VISIBLE PAPER RESIDUALS WERE DETERMINED FROM THE AIR PHOTO AND PHOTOGRAPHIC SURVEY OF THE 12TH STREET LANDFILL. THE APPROXIMATE LIMITS OF VISIBLE PAPER RESIDUALS WERE DETERMINED FROM THE AIR PHOTO AND PHOTOGRAPHIC SURVEY OF THE 12TH STREET LANDFILL. THE APPROXIMATE LIMITS OF VISIBLE PAPER RESIDUALS WERE DETERMINED FROM THE AIR PHOTO AND PHOTOGRAPHIC SURVEY OF THE 12TH STREET LANDFILL.
  3. THE EXISTING GAS PIPELINE IS CURRENTLY IN SEPTEMBER 2009. THE EXISTING GAS PIPELINE IS CURRENTLY IN SEPTEMBER 2009. THE EXISTING GAS PIPELINE IS CURRENTLY IN SEPTEMBER 2009.
  4. THE VERIFICATION SAMPLING GRID IS ESTABLISHED IN ACCORDANCE WITH THE DESIGN REPORT. THE VERIFICATION SAMPLING GRID IS ESTABLISHED IN ACCORDANCE WITH THE DESIGN REPORT. THE VERIFICATION SAMPLING GRID IS ESTABLISHED IN ACCORDANCE WITH THE DESIGN REPORT.
  5. COORDINATES FOR EACH POINT LOCATION ARE IN REFERENCE TO THE TOP LEFT HAND CORNER OF THE CORRESPONDING GRID.

12th STREET LANDFILL OTSEGO TOWNSHIP, MICHIGAN		<b>COMESTOGA-ROVERS &amp; ASSOCIATES</b> 56393-00 ME MO006 figure 2	
PROJECT/CONTRACT NAME 16' X 16' SAMPLING GRID		DATE JUNE 2010	
PREPARED BY A. STADNER		CHECKED BY A. STADNER	
DATE MAY 2010		SCALE 1" = 100'	

**TABLE 1**  
**VERIFICATION SOIL SAMPLE LOCATIONS**  
**VERIFICATION SAMPLING PLAN - ASPHALT PLANT PROPERTY**  
**12TH STREET LANDFILL**  
**PLAINWELL, MICHIGAN**

Verification Sample	Grid Location	Sample Type
1	(25,25)	Sidewall
2	(50, 75)	Sidewall
3	(75, 125)	Sidewall
4	(25, 125)	Base
5	(125, 175)	Sidewall
6	(75, 175)	Base
7	(25, 175)	Base
8	(100, 200)	Base
9	(125, 225)	Sidewall
10	(75, 225)	Base
11	(25, 225)	Base
12	(100, 250)	Base
13	(75, 275)	Base
14	(25, 275)	Base
15	(100, 300)	Sidewall
16	(75, 325)	Base
17	(25, 325)	Base
18	(50, 350)	Base
19	(25, 375)	Sidewall
20	(0, 425)	Sidewall

<b>Total Base Samples:</b>	<b>12</b>
<b>Total Sidewall Samples:</b>	<b>8</b>
<b>Total Verification Samples:</b>	<b>20</b>

**Notes:**

- The verification sampling grid is established in accordance with the design report, with the exception that the starting location (0,0) for the grid is located at the northeast corner of the excavation and all following locations are located to the southwest.
- Coordinates for each grid location are in reference to the top left-hand corner of the corresponding grid.

**TABLE 2**  
**VERIFICATION SOIL SAMPLE LOCATIONS**  
**VERIFICATION SAMPLING PLAN - MDNRE PROPERTY**  
**12TH STREET LANDFILL**  
**PLAINWELL, MICHIGAN**

Verification Sample	Grid Location	Sample Type
1	(0,0)	Base
2	(32,0)	Base
3	(48, 16)	Sidewall
4	(64, 0)	Base
5	(80, 16)	Sidewall
6	(112, 0)	Base
7	(144, 0)	Base
8	(176, 0)	Base
9	(192, 16)	Sidewall

**Total Base Samples:**

**6**

**Total Sidewall Samples:**

**3**

**Total Verification Samples:**

**9**

**Notes:**

- The verification sampling grid is established in accordance with the design report, with the exception that the starting location (0,0) for the grid is located at the northeast corner of the excavation and all following locations are located to the southwest.
- Coordinates for each grid location are in reference to the top left-hand corner of the corresponding grid.